Department of Health
and the Welsh Office

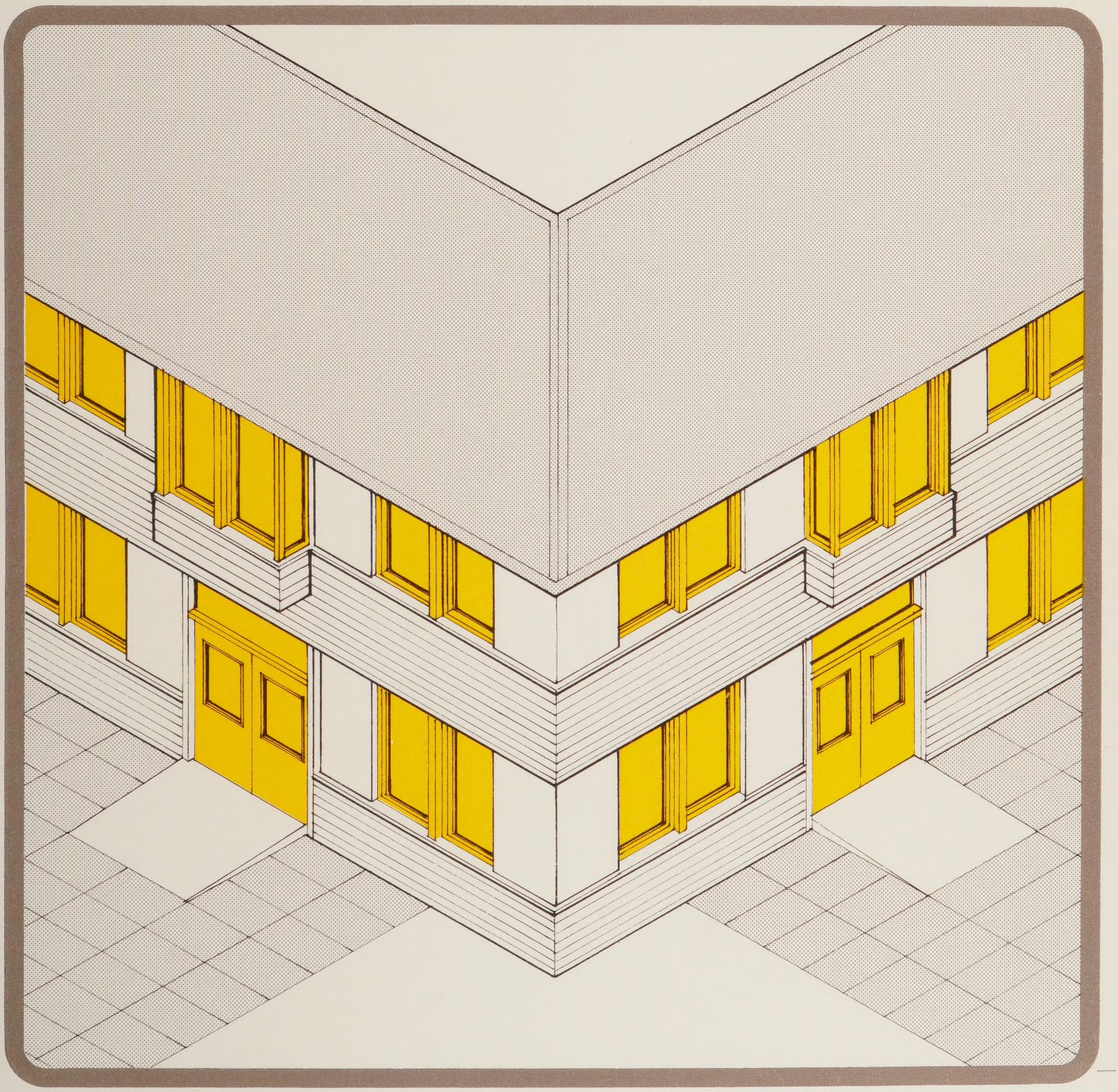
MC0009

Health Technical Memorandum

Building components

Windows

55



Digitized by the Internet Archive
in 2025 with funding from
UCL Library Special Collections

https://archive.org/details/ucl_mc0009

Department of Health
and the Welsh Office

Health Technical Memorandum

Building components

Windows

55

London:
Her Majesty's Stationery Office

©Crown copyright 1989
First published 1989
ISBN 0 11 321238 0

Contents

1 Introduction

1.1 Background
1.2 General considerations
1.3 Scope and status
1.4 Application
1.5 Relationship to other data
1.6 Terminology

2 Design guidance

2.1 Introduction
2.2 Natural lighting
2.2.1 General considerations
2.2.2 Daylight
2.2.3 Sunlight
2.3 Natural ventilation
2.4 View
2.5 Weathertightness
2.5.1 General
2.5.2 Wind resistance
2.5.3 Watertightness
2.5.4 Air permeability
2.5.5 Classification for weathertightness
2.6 Water shedding
2.7 Weatherstripping
2.8 Energy conservation
2.9 Sound insulation
2.10 Security
2.11 Safety
2.12 Fire spread
2.13 Cleaning

3 Specification guidance

3.1 Window types
3.2 Testing and assessment
3.3 Preferred range of sizes

3.4 Material and finishes
3.4.1 General
3.4.2 Aluminium
3.4.3 Plastic
3.4.4 Steel
3.4.5 Timber
3.5 Bedding and pointing of frames
3.6 Glazing
3.6.1 Glazing materials
3.7 Fittings
3.7.1 Operating height

4 Project documentation
4.1 Drawings and schedules
4.1.1 General
4.1.2 Common features
4.1.3 Window number and code
4.1.4 Glazing
4.1.5 Fittings
4.1.6 Accessories and special requirements
4.1.7 Installation details
4.2 Specification
4.3 Bills of quantities

5 Procurement

6 Site practice
6.1 Storage
6.2 Fixing
6.3 Main contractors obligations

7 Maintenance and replacement

Appendices
A National Building Specification
B Performance requirements and materials and workmanship specification
C Window to wall joint detail

References

1 Introduction

1.1 Background

This is one of a series of *Health Technical Memoranda* which provide specification and design guidance on building components for health buildings which are not adequately covered by current British Standards.

The series supersedes all Component Data Base Mk 3 (and earlier Manufacturers Data Base) information.

The numbers and titles of the HTM in the series are:

54 Building components and user manual
55 Windows
56 Partitions
57 Internal glazing
58 Internal doorsets
59 Ironmongery
60 Ceilings
61 Flooring
62 Demountable storage system
63 Fitted storage system
64 Sanitary assemblies
65 Signs
66 Cubicle curtain track
67 Laboratory fitting out systems
68 Duct and panel assemblies
69 Protection
70 Fixings

The technical information in this series is the result of research and development funded by the Department as part of collaborative working arrangements over a number of years between the Department, the NHS, and Industry through the medium of the Component Data Base.

Any enquiries regarding the technical content of this HTM should be directed to Health Building Directorate, Department of Health, Euston Tower, 286 Euston Road, London NW1 3DN.

1.2 Scope and status

This HTM offers guidance on the design and specification of internal glazing suitable for health buildings including glazed partitions, observation windows, borrowed lights and fanlights and side lights to doorsets.

Vision panels in door leaves and half glazed and fully glazed door leaves are described in HTM58, Internal doorsets.

Its content does not diminish either manufacturer responsibility for fitness for purpose of products, or design team responsibility for selection and application of products or design and specification of builders work to meet project requirements for internal glazing.

It is mainly concerned with new building work but much of the information it contains is equally applicable to replacement of internal glazing in existing buildings.

1.3 Relationship to other data

The main sources of data used in the preparation of this HTM are listed in the References section.

This HTM was prepared for printing in July 1985 and revised in June 1988, and is based on data current at that date. Readers should ensure that they use the latest edition of all building legislation, British Standards, etc., and give first preference to products and services from sources which have been Registered under BSI Quality Assurance procedures, or other certified schemes.

Suppliers offering products other than to British Standards should provide evidence to show that their products are at least equal to such standards.

1.4 Terminology

In this HTM the following definitions apply:

Internal glazing – the use of glazing in internal situations generally, (for vision panels in door leaves and half glazed and fully glazed door leaves, see HTM58, Internal doorsets).

Width – the greater horizontal dimension.

Height – any vertical dimension.

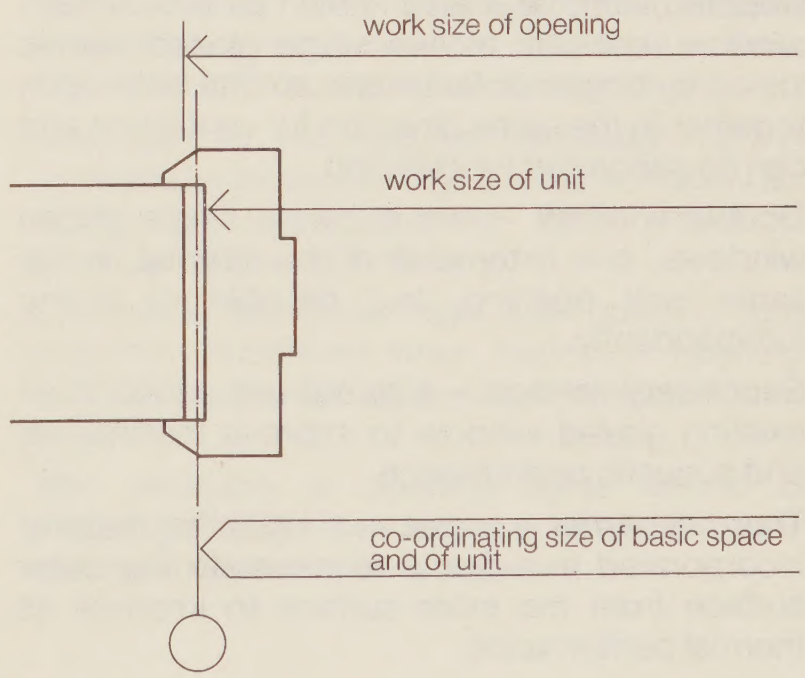
Thickness – a dimension in any plane which is small compared to other dimensions, or the least overall horizontal dimension of a frame member.

Basic space – a space bounded by reference planes assigned to receive a building component or assembly including allowance for joints and tolerances.

Co-ordinating size – the size given to a basic space.

Work size – the size of the unit or opening to which its actual size should conform within specified permissible deviations.

These terms are illustrated below:



1.6 Terminology

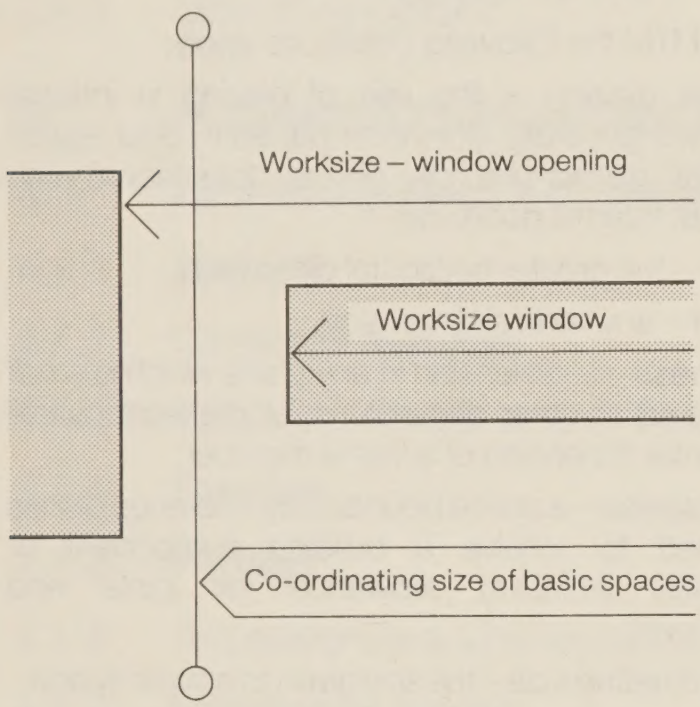
In this HTM the following terms apply. Others are defined in the sections in which they are used or in other documents listed in the References section.

Basic space – a space bounded by reference planes assigned to receive a building component or assembly including allowance for joints and tolerances.

Co-ordinating size – the size given to a basic space.

Work size – a size of a window frame or opening to which its actual size should conform within specified permissible deviations.

These terms are illustrated below:



Coupled window – also known as a dual sash window, consists of two single glazed frames joined by hinges or fasteners, so that both open together in the same direction for ventilation and can be separated for cleaning.

Double window – two separate single glazed windows, one external and one internal, in the same wall opening, but capable of acting independently.

Secondary window – a glazed unit added to an existing glazed window to improve the thermal and acoustic performance.

Thermal barrier – a spacer of insulating material incorporated in a frame to separate the outer surface from the inner surface to improve its thermal performance.

2 Design guidance

2.1 Introduction

The design of a satisfactory environment has to balance various needs.

At an early stage the designer should prepare sketch plans showing positions, sizes and types of windows. The architectural considerations and main design criteria with which they have to comply are:

- natural lighting
- natural ventilation
- view
- weathertightness
- energy conservation
- sound insulation
- security
- safety
- fire spread
- cleaning

2.2 Natural lighting

2.2.1 General considerations

The character and control of natural lighting must be based on the needs of the occupants and the function of the space.

In addition to considering the position and size of the window in relation to the use of a space, the designer should consider the effect of obstruction to vision and restriction of daylight by framing members of the window, and curtains or blinds.

Tall narrow windows give greater penetration of light than wide windows of the same area. Splayed reveals give a gradation of light from outside to inside, improve the spread and quality of light and reduce harsh contrasts which may be unpleasant to the eye.

2.2.2 Daylight

Daylight varies in quality and intensity according to location and weather conditions. Window shapes and positions can be evaluated by calculating the daylight factor using daylight protractors, reference tables and computer programs.

For further guidance see:

- DD73: Basic data for the design of buildings: daylight
- BRE Digests 41 and 42: Estimating daylight in buildings.
- Nucleus: Study No. 18
  Daylighting study of multi-bed rooms in adult acute wards.

2.2.3 Sunlight

Sunlight is beneficial provided glare, dazzle and overheating are controlled. These undesirable effects can be countered by installing various devices located either:

- outside the window
- between the glazing
- within the glass
- inside the window

and the design solution proposed checked for:

- range of control
- external view
- reasonable levels of daylight
- ease of operation
- ease of maintenance
- ease of cleaning
- ease of replacement
- effects of exposure
- cost

See DD67: Basic data for the design of buildings: sunlight.

2.3 Natural ventilation

Opening lights should be used to provide normal ventilation except where:

- the level of outside noise is unacceptable
- safety or security features must be provided
- unpleasant smells are generated either inside or outside the building.

Small openings or baffled grilles provide minimum or filter ventilation successfully. These should be positioned at high level to avoid draughts and designed so that the passage of air does not create noise which would be a nuisance to the building users. Specifiers should consider this latter performance aspect and the function of the room when selecting such components.

Maximum or hot weather ventilation can be provided by large openings but patient safety and rigidity of large opening lights must be considered (**see 2.11 Safety**).

Louvres or additional high level opening lights may be considered when restricted openings cannot provide sufficient natural ventilation in hot weather.

The provision of opening lights should be discussed with the services engineer when mechanical ventilation is provided.

2.4 View

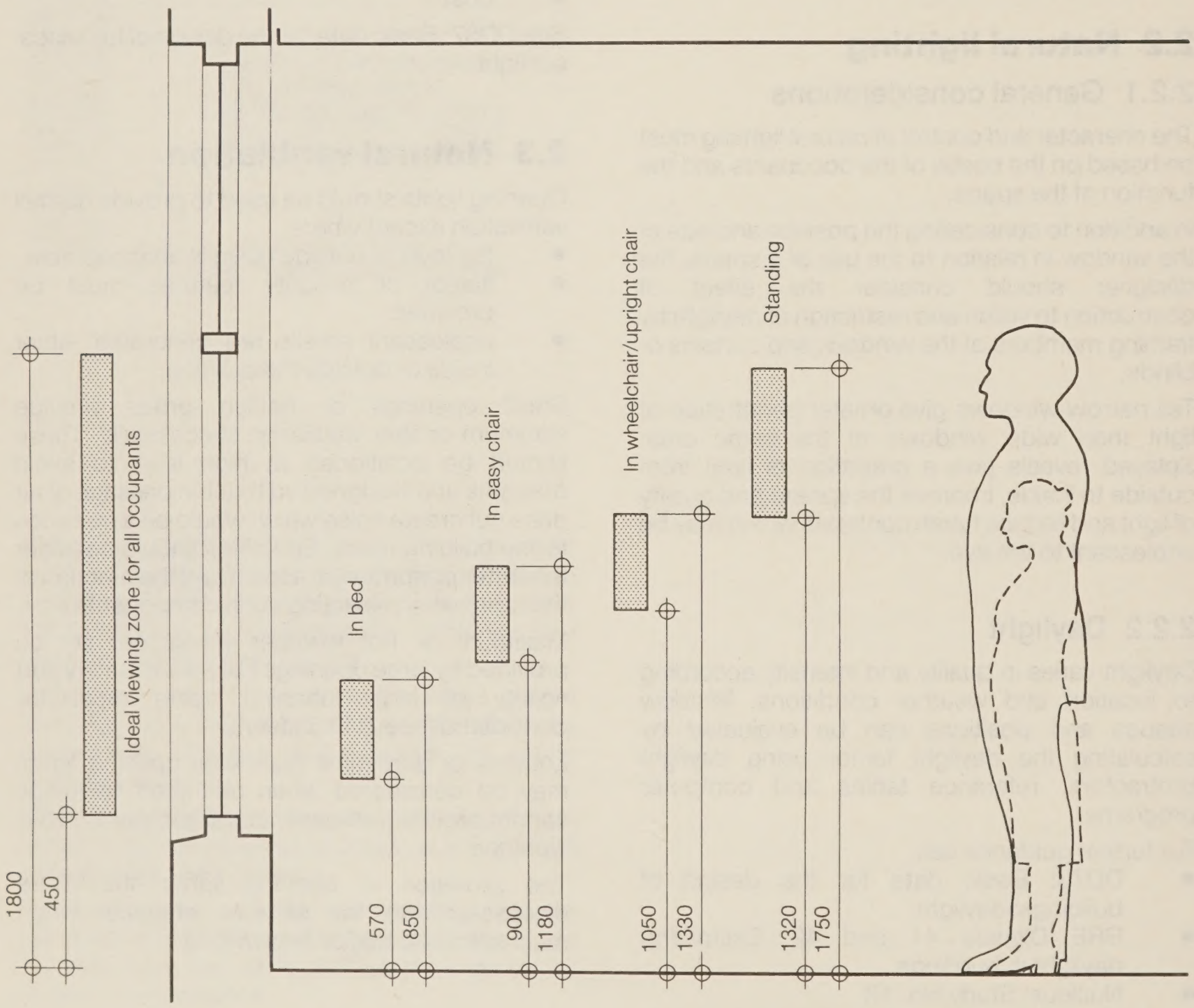
The ideal viewing zone will be determined by the eye level of occupants, depending upon whether they are standing up, sitting or lying down. The following factors will affect the ideal viewing zone:

- security and safety
- outlook and privacy
- undersill requirements for mechanical services or furniture

These factors will determine:

- size of the window
- shape of the window
- height of sill
- height of transome
- height of head

The ideal viewing zone and ranges of eye levels for all types of occupants is illustrated below (all dimensions are in millimetres). Further information may be found in Health Building Notes.



2.5 Weathertightness

2.5.1 General

Weathertightness is defined as the performance of windows in respect of

- wind resistance
- watertightness
- air permeability

The designer should determine the classification of windows in terms of weathertightness required for a given location by:

- calculating the design wind pressure
- determining the required test pressure class for wind resistance
- selecting the desired level of performance for
  - watertightness
  - air permeability

For methods of calculating design wind pressure see BS 6375 Part 1: Appendices A and B.

A BSI draft report (issued in 1984) suggests that previous methods of assessing exposure to wind driven rain in different parts of the British Isles may have given predictions as much as 50% lower than actual exposures.

The designer should therefore obtain meteorological data on wind forces and rain for the locality and visit the site to observe conditions. Actual performance in use will depend on a number of factors including the way the windows are installed in the building, the associated design detail and the degree of maintenance. For example, in the watertightness test the window is mounted flush and in practice a better performance in respect of watertightness can usually be obtained by setting a window back from the outer face of the wall.

"Hole in the wall" windows benefit by being set back from the face of the wall by say 100mm.

In brick walls this may be done by fitting the window in a rebate formed by setting back the inner leaf behind the outer skin.

For further guidance see:

- BRE Digest 119: The assessment of wind loads
- BRE Digest 127: An index of exposure to driving rain.

2.5.2 Wind resistance

The wind resistance performance of windows depends upon:

- fixed or opening lights
- strength of frame
- method of fixing
- glazing
- fittings

The wind resistance (design wind pressure) calculated as referred to in 2.5.1 should be specified as a test pressure within the range set out in Appendix B. B8.1 or such other value as may be deemed necessary to meet site conditions.

See BS 6262: Code of practice for glazing for buildings.

2.5.3 Watertightness

Windows should remain watertight at the test pressure selected (see 2.5.5) and specified as in Appendix B, B8.2. This may fall within the latter range or at such other value as may be deemed necessary to meet site conditions.

2.5.4 Air permeability

In determining an acceptable level of air permeability, account must be taken of:

- the functions of the rooms
- the need to minimise heat losses
- whether air conditioning is to be employed.

Achievement of an acceptable level within a given weathertightness classification will depend upon:

- type
- construction
- weatherstripping
- fittings.

The required level should be specified as a test pressure within the range set out in Appendix B, B8.3, or such other value as may be deemed necessary.

2.5.5 Classification for weathertightness

Classification for weathertightness is based on test pressures for wind resistance, watertightness, and air permeability as set out in BS 6375 part 1.

The appropriate test pressures can be arrived at by calculation of the required design wind pressure and by reading off the corresponding test pressures for watertightness and air permeability.

However, the specifier should not assume that the values obtained will apply automatically in all circumstances. For example, where high energy conservation values are required it may be appropriate to specify higher levels of test pressures for watertightness and air permeability than that required for wind resistance, which relates to the strength of the window and its ability to resist wind pressures.

2.6 Water shedding

Water shedding can be improved by following certain fundamental principles, eg:

- projecting mullions
- transomes and sills (to break up wind and rain driven over windows)
- drips in heads and sills
- water checks at sills and jambs
- protection over opening lights (water can stream down surfaces above the light and be blown in)
- adequate slope to all horizontal surfaces
- canopies over doors.

2.7 Weatherstripping

All windows and external doors should include weatherstripping around opening parts to improve the resistance to air permeability, elimination of water penetration and reduction of noise from outside and to retain this performance for as long as possible throughout the life of the window. This should be capable of being replaced, removed or protected during decoration or cleaning of the frame.

2.8 Energy conservation

No external wall should have a U value greater than that permitted by the Building Regulations.

The window/wall ratio has an important bearing on the U value of the wall as a whole. Double glazing will permit larger areas of glass and give better comfort near windows. Triple glazing and the use of special glasses may permit even larger areas of glass to be used and/or higher levels of insulation to be achieved.

Optimum thermal performance may favour small windows and this could conflict with the need for natural lighting, ventilation and view.

The thermal performance of a window as a whole will be influenced by its frame material eg timber and plastic frames have a better thermal performance than metal frames (see 3.4 Material and finishes).

Weatherstripping improves the thermal performance of opening lights by reducing air permeability.

2.9 Sound insulation

There is a need to identify locations where improved sound attenuation is required.

Effective reduction of sound transmission through a window can only be achieved by a high standard of design, manufacture and fitting.

Sound insulation is improved by:

- double windows with fixed lights
- double windows with weatherstripped opening lights
- sealing windows to eliminate air paths
- method of glazing
- thicker glass
- lining the reveals between windows with sound absorbent material.

An air space of 150mm between differing thicknesses of glazing gives optimum reduction. Sealed units will give a limited improvement.

For further information see:

- BRE Digests 128 and 129: Insulation against external noise.
- CP153: Windows and rooflights: Part 3: Sound insulation.
- BS 6262: Code of practice for glazing for buildings.

2.10 Security

In certain situations special security precautions are required to prevent unauthorised entry or exit. These areas should be identified early in the design stage and will include spaces housing:

- valuable equipment
- dangerous drugs
- records
- certain categories of patient
- residential staff

The use of security devices should be decided by consultation between the project and design teams who will need to consider their effect on the operation and performance of the window together with access for firemen and means of escape in case of fire.

Security devices include:

- bars
- grilles
- shutters
- special glazing
- alarms
- special locks

(see 3.6 Glazing).

2.11 Safety

Project teams must decide on the needs for safety in health buildings. The restriction of opening lights will be required in many rooms or even throughout a building.

A restricted opening of not more than 100mm is recommended for general use where windows are within easy reach of patients and is essential where windows are accessible to children (see 3.7 Fittings) and is frequently used in geriatric, maternity and psychiatric areas.

Any requirements for the use of safety glazing should be considered early in the design stage and the recommendations of BS 6262 complied with.

Particular attention should be given to glazing below 800mm from floor level on the ground floor or 900mm on upper floors.

The use of safety glazing should be considered in spaces which are accessible to children or disturbed patients and generally in exercise areas.

2.12 Fire spread

The location and size of windows is controlled by regulations and technical memoranda. These include:

- The Building Regulations
- The Building Standards (Scotland) (Consolidation) Regulations
- The London Building (Construction) Bye-Laws
- Guidance and Technical Information Notes, published by the DOE

See CP 153: Windows and rooflights, Part 4: Fire hazards associated with glazing in buildings.

2.13 Cleaning

The method of window cleaning should be agreed at an early planning stage. A decision to clean from the inside only may conflict with hospital management policy, security and safety arrangements.

Cleaning from the outside above two storeys may require cradles, projecting walkways or other safety devices such as eye bolts for use with harnesses. The Health and Safety Executive should be consulted for more detailed guidance.

Internal courtyards can pose problems in respect of ladder accessibility and special measures will need to be considered.

Frames should be capable of withstanding routine cleaning using mild detergents and disinfectants.

See CP 153: Windows and rooflights, Part 1: Cleaning and safety.

3 Specification guidance

3.1 Window types

Window types generally used in health buildings are listed below. They may be identified by the conventional abbreviations and graphical illustrations (viewed from outside) shown.

The handing of side hung windows and external doors is determined by the side on which the hinges occur viewed from the outside.

Fixed

- FL Fixed Lights

Casement

- SH Side Hung left hand, open out

- SH Side Hung right hand, open out

- TH Top Hung, open out

- BH Bottom Hung, open in

- TT Tilt and Turn

Pivot

- VP Vertical Pivot

- HP Horizontal Pivot

Moving axis

- PSH Projecting Side Hung

- PTH Projecting Top Hung

Sliding

- VS Vertical Slider

- HS Horizontal Slider

Louvred

- L Louvred

Doors

- SD Single Door, glazed left hand

- LD Single Door, louvred right hand

- DD Pair of Doors, glazed

- GP Glazed Panel

3.2 Testing and assessment

Manufacturers' product specifications and test data should be appraised to ensure that the sizes and types of windows tested are applicable to those to be used on the project.

Some tests are for units of moderate size only eg 1200 x 1200mm. If a project requires larger units for which test data is not available an authoritative assessment must be obtained from the manufacturer to cover the larger units. (See Appendix B, B2 Standards for reference to methods of test).

3.3 Preferred range of sizes

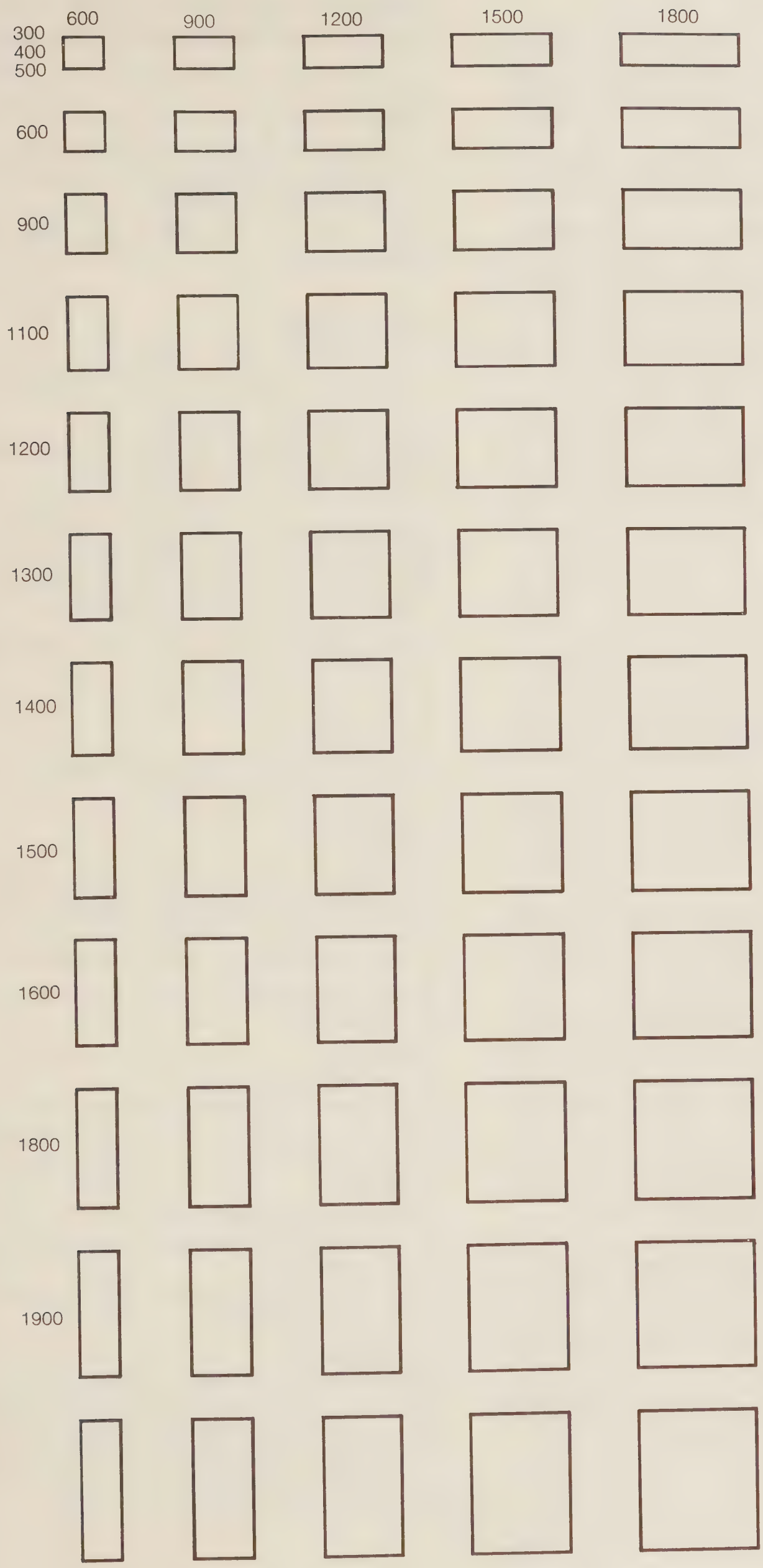
The matrix on page 10 shows a preferred range of co-ordinating sizes of basic spaces to be filled by windows of various types either individually or built up into composite units with coupling mullions and transomes.

In the interests of variety reduction and cost these sizes should be used on new projects. However, they may not be suitable for existing buildings as replacement windows will have to fit existing openings and manufacturers of 'special' sizes will have to be consulted.

Manufacturers should be consulted regarding the limitations on the width and height of windows, depending on:

- type of opening light
- frame construction, eg multiple glazing
- material
- fittings
- glazing.

Matrix of preferred sizes (mm)



3.4 Material and finishes

3.4.1 General

Steel and wood windows are commonly delivered to site for finishing by others, although factory finished windows in both these materials are also available. Aluminium and plastic windows are factory finished.

Special care should be exercised in the selection of finishes in industrial and marine atmospheres.

When selecting surface finishes with a relatively low initial cost and short life, eg stains or paint finishes on wood, the periodic refurbishment that will be necessary should be assessed. Apart from the cost of this work and the problems of access it will also cause considerable disruption and inconvenience to the building users.

The figures quoted in this section for the maintenance free life of window frames of differing materials are taken from BRE Technical Information Sheet No. TIL 65: Window materials and finishes. They will vary according to site location, exposure, atmospheric pollution, maintenance, etc.

See BRE Digest No. 262: Selection of windows by performance.

3.4.2 Aluminium

Mill finish is not recommended as it will become unsightly and could ultimately incur significant maintenance costs.

Liquid organic coating to BS 4842 should offer a maintenance free life of about 10 years. It is not recommended for marine and industrial environments.

Anodising to BS 3987 should offer a maintenance free life of 15 years or more in normal locations. It is not recommended for marine and industrial environments.

Powder organic coating to BS 6496 is thicker than other finishes and has an expected maintenance free life of up to 20 years. The thicker finish also affords improved protection against impact damage.

Ultimately all finishes will deteriorate and the frames will need further protection. At this time manufacturers advice should be sought.

Aluminium frames can act as a cold bridge and will generally result in condensation forming on the inner surfaces. Some provision should be made for condensation run off in such windows. Frames containing a thermal barrier are claimed to reduce cold bridging.

(See Appendix B: B5.1 for appropriate initial specification).

3.4.3 Plastic

The lighter coloured materials have the advantage over the darker colours in that solar heat gain, expansion and contraction are less.

Cleaning may well be desirable at intervals in polluted atmospheres, but the frames should offer a maintenance free life of up to 25 years.

Frames made up of this material, in whole or in part, may minimise the risk of condensation resulting from cold bridging.

(See Appendix B: B5.2. for appropriate specification).

3.4.4 Steel

Galvanizing provides good durability in mild and moderate environments but normally requires painting for aesthetic reasons.

Factory applied polyester coatings offer a maintenance free life of up to 15 years.

Steel frames can act as a cold bridge and will generally result in condensation forming on the inner surfaces. Some provision should be made for condensation run off in such windows or an alternative frame material accepted.

(See Appendix B: B5.3. for appropriate specification).

3.4.5 Timber

Timber frames provide good thermal insulation minimising the risk of condensation.

Hardwood

Appearance and good functional performance are reasons for selecting hardwood windows. Resistance to decay is largely determined by the correct choice of species. However, with certain species preservative treatment is essential.

See BRE Digest No 262: Selection of windows by performance.

Softwood

Preservative treatment

Softwood windows should have preservative treatment applied by a licensed processor. The double vacuum process is suitable for all types of softwood.

For further information see:

- BS 5589: Code of practice for preservation of timber
- BRE Digest No. 73: Prevention of decay in external joinery.

Paint finish

In addition to preservative treatment and factory priming, an undercoat and two finishing coats are recommended by BRE as offering a potential maintenance free life of 5 years on external surfaces. Two undercoats and one finishing coat are recommended for internal surfaces.

Newer types of microporous paint or moisture vapour permeable coatings are alternatives to the more traditional paint systems. They are easier to maintain due to improved weathering characteristics, but preservative treatment is still essential.

The following factors should be considered:

- oil based or water based type
- priming paint of compatible formulation.

For further information see:

- BS 6150: Code of practice for painting of buildings
- BRE Digest No. 261: Painting woodwork
- BRE Information Paper IP9/84: Water borne paints for exterior wood.

Stain treatment

Stain treatment is an alternative to paint, offering a different appearance, but is less protective and less able to hide defects. It does not obviate the need for preservative treatment.

The use of stains could allow greater variations in moisture content to take place, with consequential variations in dimensional stability and splitting of the timber.

The following factors should be considered:

- the use of better quality timber
- the use of bead or gasket instead of putty glazing
- more frequent but easier maintenance
- the use of a low solid or high solid type of stain
- The compatibility of bedding, pointing and glazing compounds.

See BRE Digest No. 286: Natural finishes for exterior timber, and **Appendix B: B5.4 for appropriate specifications for timber windows.**

3.5 Bedding and pointing of frames

Frames should be bedded either in a sub-frame or directly into the window opening. The expected movement at these junctions must be considered.

Window frames, sub-frames and surrounds of dissimilar materials and having differing co-efficients of expansion, will require bedding compounds with an inherent elasticity.

Bedding compounds are not suitable for pointing. Apart from having insufficient flexibility and waterproofing characteristics they may deteriorate on exposure to the elements. Traditionally, oleo-resinous sealants (oil-based mastics) were used as pointing material, but such relatively labour intensive and hard materials are being superseded by gun-applied sealants.

Sealants vary in quality and in performance from the cheaper oleo-resinous and butyl rubber based compounds to the expensive one or two pack polysulphide sealants. The maintenance free life of these sealants vary from 5 years to approximately 20 years respectively.

Sealants are expensive and joint widths should be kept as small as practicable. If excessive joint depths are anticipated, a backing material such as bitumenised foamed polyurethane sealing strip is often used in pre-compressed form and inserted in the joint before pointing.

The avoidance of premature failure of the joint will depend on:

- good joint design
- careful selection of sealant
- preparation of joint surfaces
- correct application of sealant

Undue reliance should not be placed on sealants as they are not an adequate substitute for good constructional details.

See Appendix C for window to wall joint details.

3.6 Glazing

Steel and wood windows are generally supplied for glazing by others. Aluminium and plastic windows are generally factory glazed.

The type of glass and glazing method will be determined by the design guidance as set out in Section 2. Further guidance on the selection of glazing is given below.

Solar control

The use of tinted, solar reflective or other specialised or coloured glass should only be used after the clinical effect has been considered (**see 2.2.3 Sunlight**).

Privacy

As well as sanitary accommodation obscured glass is often required in spaces such as examination and consulting rooms. The degree of obscuration should be determined by the privacy needed from either side of the glass and the difference between internal and external lighting.

Glass thickness

Glass thickness should be determined by the design wind pressure it will have to withstand. It should be calculated in accordance with the recommendations in BS 6262: Code of practice for glazing for buildings.

Energy conservation

In sealed glass units the optimum width of air space is 20mm. Below 20mm the insulation value progressively decreases until it approaches that of single glazing. Above 20mm the value remains practically constant (**see 2.8 Energy conservation**).

See BRE Digest 140: Double glazing and double windows.

Security and safety
The need for special glazing can be met by one of the following types:

- laminated
- toughened
- wired
- plastic
- wired plastic

(see 2.10 Security and 2.11 Safety).

Fire spread
In certain locations there may be a need for the use of fire resisting glazing. This may be met by wired or special fire resisting glass (see 2.10 Security).

3.6.1 Glazing materials

The most common materials for glazing are oil-based putty, glazing compounds, glazing beads, glazing clips, and preformed gaskets.

Wood beads should always be back primed to prevent absorption of binder from the glazing compound and excessive changes in moisture content. Exposed arrises should be rounded to avoid early paint failures and special attention should be given to the detailing of the bottom bead to ensure water shedding.

Highly flexible and weather resistant sealants should be used when glazing to metal and plastic frames and to wood frames treated with preservative stains.

(See BS 6262: Code of practice for glazing for buildings).

3.7 Fittings

Windows and external doors should be complete with the appropriate fittings which should be assessed for ease of operation, security, safety and mechanical wear.

The choice of material and finish will be determined by the window material selected and the range of fittings offered by the window manufacturer.

Typical sets of fittings for window types are as follows:

Casements	• hinges • fasteners • stays • handles • restrictors
Pivot windows	• adjustable friction pivots • bolts to give multi-point fixing • safety catches • handles • restrictors
Sliding windows	• fittings to operate the sliding sashes • catches • locking devices • restrictors • position keeps
projecting windows	• pivots sliding in grooves • safety catches • locking devices • handles • safety stays to restrict the opening

Restrictors should be types that can only be disengaged by means of a special tool or key. Socket head securing screws may be suitable.

Additional fittings:

- Night ventilation devices consisting of fasteners or catches to hinged and pivoted opening lights to provide a minimal opening.
- Blackout devices consisting of roller blinds of light proof material housed in light tight frames fitted in the window openings.

3.7.1 Operating height

The maximum height for operating most opening devices when the user can stand close to the wall is about 1600mm. In other siuations it may be necessary to use some form of remote operating device, such as cords or mechanical winding mechanisms. The use of poles should be avoided.

Stays and the like on high level windows in deep reveals may be difficult to operate and a sloping cill often alleviates the problem.

Where vertical sliding windows are to be used, consideration could be given to the use of a full width low level bar attached to the upper sash. This will enable the sash to be opened without resorting to the use of poles or mechanical devices.

4 Project documentation

4.1 Drawings and schedules

4.1.1 General

The drawings and schedules should contain the necessary information for:

- preparation of bills of quantities
- ordering, manufacturing and delivery
- installation

4.1.2 Common features

Features common to all windows or groups of windows in the project should be specified eg:

- material
- finish
- colour
- classification for weathertightness

4.1.3 Window number and code

Each window should be numbered sequentially for ease of reference. A code can be assembled by combining type abbreviations (**see 3.1**) and numerals for co-ordinating sizes as listed below:

Code	width mm	Code	height mm
6	600	3	300
9	900	4	400
12	1200	5	500
15	1500	6	600
18	1800	9	900
		11	1100
		12	1200
		13	1300
		14	1400
		15	1500
		16	1600
		18	1800
		19	1900
		21	2100

Example: SH/6/12
side hung/600 wide/1200 high

4.1.4 Glazing

Specify type of glazing (**see 3.6**)

- single or double
- material
- thickness
- clear, patterned or obscured
- wired
- toughened or laminated
- solar control

Specify glazing materials (**see 3.6.1**)

- putty
- compounds
- beads
- clips
- gaskets

4.1.5 Fittings

Specify a set of fittings for each window type (if not predetermined by the manufacturer) by:

- operation
- location
- material
- finish

Each set of fittings could have a code letter (eg A, B, C, etc) which can be entered on the drawings or schedule.

The indication of handing on the elevational drawings (**see 3.1**) will obviate the likelihood of errors occuring.

4.1.6 Accessories and special requirements

List accessories required for each window eg:

- ventilation inserts
- guard bars
- blinds
- blackout
- fly screens
- maintenance safety devices

4.1.7 Installation details

Drawings should be prepared indicating in detail the relationship of the windows to the adjoining components in the external wall. These should show:

- location
- head, cill, jamb (**see Appendix C**)
- dpc's and flashings
- fixings
- bedding and pointing
- drips
- condensation channels
- window boards

4.2 Specification

The project specification may be in performance or materials and workmanship form or a combination of these.

It should take account of the following:

- details of fixing devices
- provision of blocks or plugs for fixing frames to the window surrounds
- provision of templates for forming window openings
- removal of protective wrappings
- treatment of any timber cut on site, with preservative
- suitable bedding materials
- pointing around frames and backing material
- adjusting lubricating and cleaning operating controls and fittings prior to hand over
- cleaning frames and glazing, both inside and out, prior to hand over

The specifications in Appendices A and B may be used as a basis for the preparation of the project specification.

4.3 Bills of quantities

The bills should contain the above specification with quantities and should also cover any specific programming requirements, methods of protection or any other unusual contractual arrangements.

5 Procurement

Product data should be obtained from the manufacturers or the relevant trade associations.

Suppliers offering products other than to UK standards should be required to produce evidence that their products are at least equal to those standards.

In selecting manufacturers use may be made of the list of approved suppliers forming part of the current PSA Method of Building Programme which is based on PSA product evaluation and testing procedures.

The performance specification upon which the PSA Programme was based was prepared in conjunction with the DoH. An updated and modified version of this specification is included at Appendix B and firms on the PSA list have agreed to tender for health building projects using JCT forms of contract.

Where windows are to be procured from firms other than those on the PSA/MOB approved list, they should be evaluated by the specifier to ensure that they comply with the specification in Appendix B.

6 Site practice

6.1 Storage

Where windows are to be stored on site, proper facilities must be provided. Advice on good practice for the protection of windows on site is given in CP 153: Windows and rooflights Part 2: Durability and maintenance.

Where units are delivered in protective packaging, arrangements must be made for its removal at the latest practicable stage prior to hand over.

6.2 Fixing

The type and method of fixing will be determined by whether windows are built into prepared openings or installed as the work proceeds. Bearing in mind the need for adequate fixings at head, sill and jambs, the manufacturer should be required to supply all relevant information concerning the type and number required, to resist the design wind pressure and details of the preparatory builders work involved.

These may take the form of cramps, ties, lugs or screws, but in all cases the materials used must be compatible with the window frames and be corrosion resistant.

In the event of site cutting or easing of timber windows or surrounds all initial preservative and priming treatments must be made good before fixing.

It is important to ensure that specified tolerances have not been exceeded as performance can be impaired if components do not fit properly.

Building in details at jambs heads and cills should take into account junctions with damp proof courses.

Some building-in principles at jamb, head and sill and junctions with damp proof courses are illustrated in Appendix C.

6.3 Main contractors obligations

The facilities and attendances which the main contractor will provide to the window manufacturer either as a supplier or a sub-contractor, will be a matter for agreement between them.

7 Maintenance and replacement

The form and type, material, finish, accessories and accessibility of windows should be considered in respect of the maintenance, cleaning, repair and replacement of the whole or part of the component.

All fittings and finishes should be selected to facilitate maintenance and cleaning.

A project maintenance manual should be compiled by the project architect and should be handed to the maintenance staff.

The manual should include the following:

- identification of manufacturer
- window specification
- method of replacement of glass
- size and thickness of glass
- type and pattern of glass
- fittings, including safety devices
- gaskets, bedding and pointing materials
- finishes
- instructions on cleaning and maintenance

Site painted timber windows

When programming the first repainting of timber windows the following should be borne in mind:

- that the windows will have been painted some time before the practical completion of the building
- the anticipated maintenance free life of the initial paint system.

The first repainting should therefore be carried out earlier than normal maintenance routines would suggest. A report entitled *Blight on Britain's Buildings – a survey of paint and maintenance practice* published by the Paintmakers Association of Great Britain Ltd. indicates that one to two years after completion of the building is probably the optimum period.

For further information see:

- CP 153: Windows and rooflights Part 2: Durability and maintenance
- BRE Information Paper IP 9/84: Water borne paints for exterior wood

Appendices

A National Building Specification

NBS is a library of standard specification clauses, covering most kinds of building work and comprises a wide range of clauses, with accompanying guidance notes. All clauses are optional and their combination into a job specification is left to the specifier. NBS has great flexibility and it can be adapted to suit the technical needs and preferences of differing projects, organisations and specifiers.

Specifications go out of date as a result of technical innovation or major review of a key BSI document. As NBS sections become affected by such major changes they are re-issued to members of the subscription service. Users are advised to ensure that they refer to the current edition.

B Performance requirements and materials and workmanship specification

This Appendix sets out the performance requirements and materials and workmanship specification for windows suitable for use in health buildings.

It is intended that it shall be used:

- to make initial enquiries to manufacturers in order to prepare a list of suppliers for inclusion in contract documents, or
- to obtain estimates in order to calculate a PC sum for inclusion in the bills, or
- as a project specification.

Prior to issue this specification will need to be edited and amplified with project drawings and schedules. The final combination of classes to form a project specification is the responsibility of the specifier.

Where a ★ sign is shown, complete as appropriate.

Index

B1 Introduction
B2 Standards
B3 Description
B4 Types and sizes of windows
B5 Materials and workmanship
B6 Cleaning and disinfection
B7 Exposure conditions
B8 Weathertightness
B9 Strength and safety of moving parts
B10 Manoeuvrability and control
B11 Security
B12 Thermal insulation
B13 Sound insulation
B14 Installation
B15 Durability and reliability
B16 Requirements of accuracy

B1 Introduction

This specification is based on a performance specification prepared jointly by the Property Services Agency, Method of Building and the Department of Health Component Data Base. The clauses set out below have been updated to take account of BS 6375: Performance of windows Part 1: Classification for weathertightness and Part 2: Specification for operation and strength characteristics.

B2 Standards

The windows shall comply with the current editions of all relevant British Standard Specifications, Codes of Practice and statutory requirements with regard to their performance, constituent materials, method of assembly and use.

B3 Description

The requirements apply to windows and matching doors and doors forming an integral part of a window unit, manufactured as non-loadbearing single or composite units, coupled horizontally and/or vertically.

The units shall include as appropriate:

- frame
- sub-frame
- fixed lights
- opening lights
- solid infill panels
- glazing and glazing components
- sill
- fittings
- all accessories necessary to complete and install the window units and to ensure their normal operation.

B4 Types and sizes of windows

See project drawings and schedules.

B5 Materials and workmanship

B5.1 Aluminium

Aluminium windows and finishes shall conform to BS 4873.

Finishes:

★ liquid organic coating shall conform to BS 4842 with a minimum thickness of 25 microns

★ anodising shall conform to BS 3987 with a minimum thickness of 25 microns

★ powder organic coating shall conform to BS 6496 with a minimum thickness of 50 microns

B5.2 Plastic

Plastic windows shall be in accordance with "A trade standard for UPVC windows" published by the British Plastics Federation and the Glass & Glazing Federation, and the requirements stated in the Quality Assessment Schedules: QAS/M/4834/18 and 19, to BS 5750 (Note: These Schedules relate only to white PVC windows). Manufacturers of plastic windows will be expected to submit a certificate of Compliance with this Quality Assurance Scheme, such certificate being issued by the BSI Quality Assurance Division. Hollow section windows shall be constructed of multi-chamber sections with structural walls at least 3 mm thick.

B5.3 Steel

All steel windows shall be:

★ fully factory finished

★ in galvanised state for site painting

★ Module 100 (F Section):
Standard metal windows made from F sections shall conform to BS 6510.

★ W20 Range.
The W20 range of windows shall conform to BS 6510.

The windows shall be capable of receiving:

★ bead glazing
★ putty glazing
★ double glazing

★ Finishes
Where factory finished windows are offered they shall be coated with powder coating to BS 6497 with a minimum thickness of 50 microns.

All windows are to be supplied with factory fitted weatherstrips in accordance with BS 6510.

B5.4 Timber

Wood windows for health buildings should comply with BS644 Part 1: 1989 together with the other requirements of this specification.

Quality of timber

The materials and workmanship shall comply with Parts 1 and 2 respectively of BS 1186.

The timber for glazing beads, drip moulds and the like shall be at least Class 1.

The timber for frames, sills, casements, and all other members shall be:

★ Class 2(*) for paint finish

★ Class 1 for clear or stain finish

★ Class CSH for clear or stain finish

Note

(*) Compliance with Section 4 of BS 1186: Part 1

- All joints, particularly at corners, shall be properly filled and finished flush with the surface.
- Non-opaque finishes:
  Where the class of timber offered is less than CSH (i.e. Class 1) then, with reference to A3 of BS 1186: Part 1: 1986, finger jointing of sections is not acceptable.
- Decay and insect attack:
  Use of windows in certain situations may be subject to use of timber of "Preferable Level" of distribution, and/or of pinholes.

  Preferable level:
  Distance between pinholes and/or total number limited by agreement between user and manufacturer by reference to 100 x 50 x 1000 mm sample.

  Acceptable level:
  Permitted in filled as specified in Section 4 of BS 1186: Part 1: 1986.

★ for clear finish or stain treatment where very light stains will be used: Class 1, but in addition:

- plugs and inserts will not be permitted
- pin knots must not exceed 6 mm, but knots will not be permitted at all on arrises
- pinholes will not be permitted.

Preservative treatment

All softwood and certain species of hardwood shall receive preservative treatment. This shall be by double vacuum as specified below:

- double vacuum treatment: apply an organic solvent preservative to BS 5707 Type F/N solution with water repellent by double vacuum process in accordance with British Wood Preserving Association standards Nos 112-116 appropriate to timber species and use. This treatment to be undertaken by a licenced processor of one of the firms listed below:

  Cementone-Beaver Ltd (Wykamol Division): BWPA Standard 114
  Cuprinol Ltd: BWPA Standard 115
  Fosroc Ltd (Timber Treatments Division): BWPA Standard 116
  Hicksons Timber Products Ltd: BWPA Standard 112
  Rentokil Ltd: BWPA Standard 113 or equivalent.

Moisture content

The moisture content of the timber during manufacture and when the windows are handed over to the user shall be within ± 2% of the average equilibrium moisture content that it is expected to attain in service which is 17%

Adhesives

Adhesives shall be synthetic resin complying with BS 1204: Part 1: type WBP.

Finishes

All exposed surfaces shall have a smooth surface without burrs, ripples, pitting, splintering, brush marks or sharp edges. Timber shall be consistent in colour and grain or texture on all visible surfaces. Finished wood must be free of torn grain marks after machining and sanding. Glue lines must be consistently narrow and even.

Arrises

All exposed arrises are to be eased.

Factory primed

Windows prepared for site painting shall be prepared and primed in accordance with BS 6150.

★ The primer shall be suitable for use with the species and preservative, and shall be to BS 5358: Type A for softwood, and aluminium primer to DEF 1418 for hardwoods.

★ Where microporous type opaque finishes are intended, windows shall be prepared in the factory and one coat of primer applied in accordance with paint manufacturer's instructions.

Factory finished

★ Evidence shall be submitted of the service life of the finish specified by the manufacturer.

Natural finishes

For light stains quality of timber shall be to BS 1186: Part 1, Class CSH or 1. Windows shall be prepared in the factory for the application of low-solid, high solid or oqaue type stains in accordance with stain manufacturer's instructions. Reference to "Finishes for Outdoor Timbers", TRADA, May 1975 is recommended. One coat of stain shall be applied in the factory. Finished wood must be free of torn grain marks after machining and snading. Glue lines must be consistently narrow and even.

B5.5 Glass and glazing

Glass and glazing shall conform to:
BS 952: Glass for glazing : Part 1 : Classification.

★ BS 5713: Specification for hermetically sealed flat double glazing units.

BS 6262: Code of practice for glazing for buildings.

For sizes, thicknesses or types of glass and methods of glazing, see project drawings and schedules.

Co-extruded beads on uPVC windows are not acceptable.

B5.6 Weatherstripping

All opening lights shall be weatherstripped.

Weatherstrips shall normally be mechanically fixed.

Manufacturers shall be required to demonstrate that the weatherstripping system has a minimum life expectancy of 10 years.

B5.7 Compatibility of materials

The windows shall not contain materials which could be detrimental to the comfort or safety of the users. There shall be no detrimental reactions from contact between adjacent parts of the windows or between the windows and their fixings. Particular care should be taken to ensure that untreated steel or aluminium screws are not exposed during storage or before painting.

In replacement work in occupied buildings the manufacturer must specify the need for adequate ventilation where high odour materials are used, alternatively low odour materials requiring less ventilation may be specified.

B5.8 Fittings

The type, pattern or finish of the operating fittings for use on windows shall be:

★ entirely at the option of the window manufacturer and fitted in the factory

★ selected by the specifier and fitted on site by the main contractor

★ selected by the specifier and purchased and fitted in the factory by the window manufacturer.

B6 Cleaning and disinfection

Windows shall be capable of withstanding routine cleaning with mild detergents or disinfectants, without deterioration or discolouration of surface.

B7 Exposure conditions

The functional performance of the windows shall not be impaired when exposed to:

- ambient air temperature within the range –20°C to +35°C
- maximum surface temperature on the exposed face not exceeding 80°C
- a maximum differential of relative humidity over the range:
  - outside faces: 60 to 95% RH at 5°C
  - inside faces: 30 to 100% RH at 25°C
- atmospheric pollution of types U and/or M, as described in CP 153 : Part 2 : Table 4
- biological attack, eg by insects or fungi
- wind pressure and buffeting on the facade of buildings, calculated in accordance with BS 6375: Part 1: 1983 Appendix B.
- maximum surface temperature on the exposed face not exceeding 80°C.

B8 Weathertightness

BS 6375 : Part 1 classifies windows for weathertightness in terms of test pressure levels for:

- wind resistance
- watertightness
- air permeability

B8.1 Wind resistance

When tested in accordance with BS 5368: Part 3 the windows shall meet the performance requirement given in Clause 7 of BS 6375 : Part 1 for test pressure class as of:

★ 2000 pascals
★ 2400 pascals
★ 2800 pascals

B8.2 Watertightness

When tested in accordance with BS 5368 : Part 2 the windows shall meet the performance requirement given in Clause 6 of BS 6375 : Part 1 for test pressure class of

★ 200 pascals
★ 300 pascals

B8.3 Air permeability

When tested in accordance with BS 5368 : Part 1 the windows shall meet the performance requirement given in Clause 5 of BS 6375 : Part 1 for test pressure class of

★ 200 pascals
★ 300 pascals
★ 600 pascals

Fixed lights

The air permeability rate shall be not greater than 1 cubic metre per hour per metre length of the visible perimeter of glass when tested at the same pressure as opening lights.

B9 Strength and safety of moving parts

The moving parts of the windows and doorsets offered shall have sufficient strength and robustness to withstand incidental static and dynamic loads occuring during use. Strength and robustness of the windows will be assessed by selected mechanical tests, appropriate to different types of window operation. After each test the window shall function normally and any damage and deformation shall be within the prescribed limits. The overall evaluation will be based on the test results and experience from use. (All tests shall be in accordance with BS6375 Part 2).

In addition to BS 6375 Part 2 where untried mechanisms, fittings, weatherstrips, etc, are used or where the specifier may be in doubt as to the mechanical performance of the assembly the manufacturer may be required to submit a window to an endurance test of not less than 20,000 complete opening, closing and locking cycles.

It shall not be possible for any opening light to become accidentally disengaged from the outer frame.

The following safety fittings shall be provided where appropriate:

- reversing catches:
  these shall be provided to hold pivoted or projected windows firmly when reversed for cleaning or other maintenance. They shall engage automatically when the window is reversed, and shall need some deliberate action to undo them when the window is to be closed.
- restrictor devices:
  these shall check the opening of an opening light, of whatever type, at an aperture of not more than 100 mm. To permit the window to be opened more widely, the catch shall be capable of being unfastened by means that are operable only by a tool or a key. The catch shall re-engage automatically when the window is closed.
- remote controls:
  these shall be provided for opening lights in positions as indicated on project drawings.

B10 Manoeuvrability and control

The windows shall be designed for manual control and the forces required for their operation shall not exceed those stated in BS 6375 Part 2.

All windows shall comply with the appropriate recommendations in BS CP 153 : Part 1, clause 11, or shall provide equivalent standards of safety for occupants and operatives.

It is desirable that all high level opening lights are opened at a point not more than 1575 mm above finished floor level.

Fasteners to hinged and pivoted opening lights shall enable a light to be held at an opening of approximately 20 mm for night ventilation.

Windows depending on friction devices to control the degree of opening shall be capable of holding the window open under a pressure of 50 Pa. Where these devices are unable to achieve this with the window opened to the extremity of the restriction device (or 100 mm), then the manufacturer shall provide an auxiliary hold open device.

The space between the back face of operating handles and the window frame shall not be less than 30 mm.

In the case of tilt and turn windows the operating handle shall be designed to function in such a way that the locking position for the bottom hung mode occurs before that for the side hung mode. Preference will be given to a locking system which prevents the use of the side hung mode except by means of key operation.

B11 Security

This section does not cover windows for high security buildings. Precise acceptance criteria are not specified but there is a requirements for windows offering a greater resistance against forced entry. Manufacturers shall be conversant with the BS guide for Security of Buildings against crime, BS 8220 Parts 1 and 2.

Fasteners shall be designed so that they cannot be released from the outside by the insertion of a thin blade or other simple tool.

No opening light shall be openable or removable from the outside when it is fastened in the closed position, except by breaking a part of the window.

Where shewn windows shall be provided with:

- Special locks operated from the inside of the window with removable keys.
- Adjustable fasteners as specified in B10 providing security against unauthorised entry.
- Internal bead glazing system providing maximum security.

Vertical and horizontal sliding windows:
Any movement occurring between the inner and outer sashes on closing shall be capable of being taken up and locked by the operation of the fitch catch or other locking device.

B12 Thermal insulation

Thermally insulating windows shall be:

- ★ of any framing material which can contain sealed double glazing units provided that the average U value of the frame and glazing is 3.4 W/m²K or better.
- ★ double windows
- ★ coupled (or dual sash) windows
- ★ provide condensation channels to single glazed windows.

B13 Sound insulation

Suppliers offering sound insulating windows will be required to state the sound reduction index as recorded under test conditions. (See test method 17 in Appendix to the performance specification referred to in B2).

Where windows are offered for their sound insulation properties, the manufacturer shall state the attenuation of airborne sound of these, measured as described in BS 2750 and BS 5821.

The minimum requirement will be for these windows to have a Sound Reduction Index of 35 dB when closed.

Manufacturers shall produce test data to confirm the performance of the products.

B14 Installation

The manufacturer must provide adequate fixings to maintain the performance of the windows.

The frequency of the fixing position will be left to the manufacturer but must be adequate to withstand the imposed loading.

The fixing of sills and the fixings of windows to any sills shall be adequate to meet the performance requirements.

All fixing items straps, shims, clips, brackets, lugs, screws, etc. shall be manufactured from:

1. Stainless steel to BS 6105: 1981 grades A2, A4 or F1.
2. Steel Zinc plated to BS 1706 ZN3 or ZN10.
3. Steel passivated to BS 6338 clauses 2C or 2D.
4. Steel hot dip galvanised to BS 729 minimum mass of 460 g/m^2
5. Steel zinc spray coated to BS 2569: Part 1. ZN4.

Windows shall be capable of being fixed into their openings so that any inaccuracy in their fittings shall not adversely affect their performance.

B15 Durability and reliability

The windows will be operated by users with considerable frequency and with little incentive to exercise care, and therefore robustness and simplicity of operation of the component or assembly is important.

On the assumption that the window may have a life of 60 years the manufacturer's recommendations for maintaining the windows shall be stated, together with an indication of the likely frequency of such maintenance.

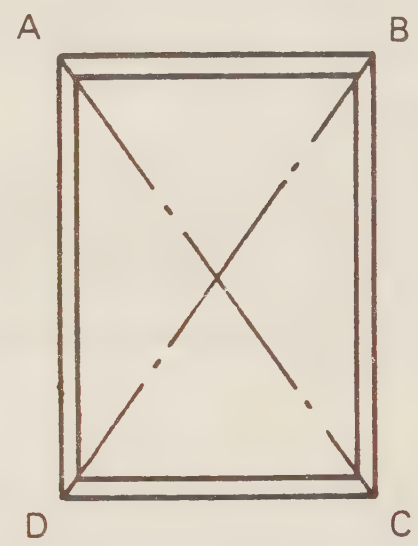
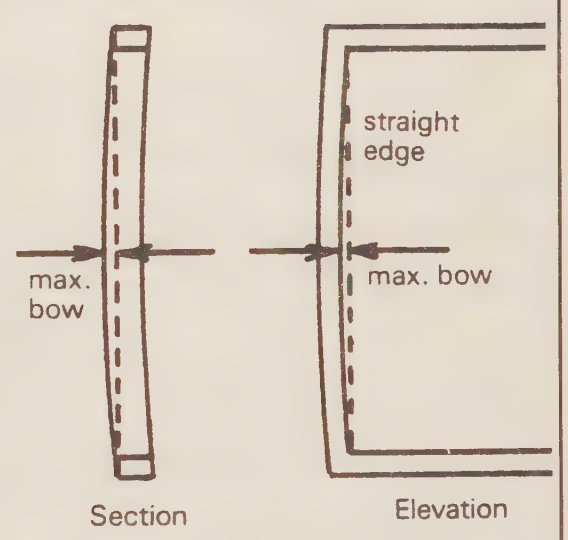
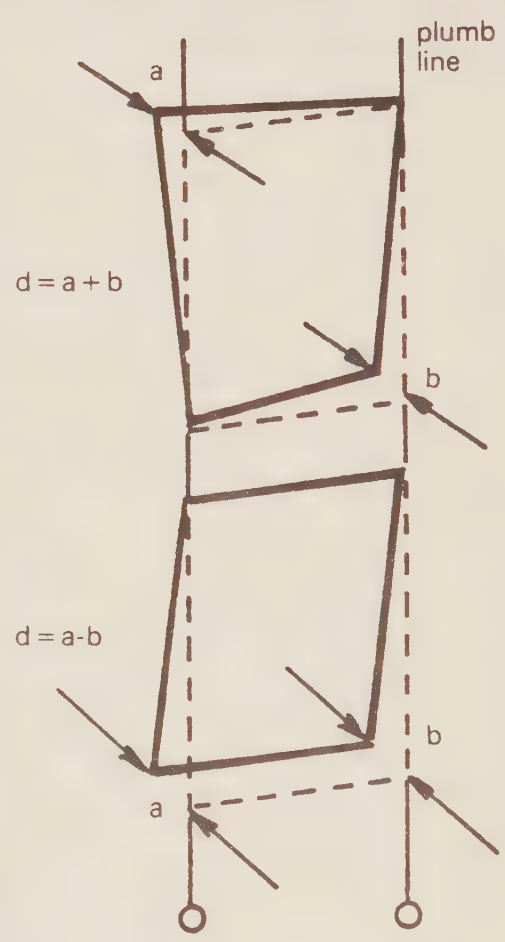
Individual parts of the window or window system, excluding hinges, pivots and similar hanging devices, may have a shorter life than the total component provided the parts are easily removable and replaceable. In no case however, should any part of the window system have a life of less than 10 years. Successful tenderers will be required to list such parts stating their lives and giving the names of the suppliers, the part reference numbers and their current cost of replacement.

The manufacturer is to state his recommendations for maintaining the surface or applied finish of the windows in a satisfactory condition, together with an indication of the likely frequency of such maintenance, assuming the windows are not subject to abuse. Preference will be given to window materials and applied finishes with the lowest frequency of maintenance.

In polluted and marine atmospheres all factory applied finishes, excluding those for wood windows should have a minimum life of 5 years without cleaning.

B16 Requirements of accuracy

Table 1

REQUIREMENT	ENVIRONMENT		LEVELS OF PASS		NOTES
	Temp. °C	R.H. %	LOCATION	MAXIMUM DEVIATION	
1. SQUARENESS	25	65	Maximum difference between diagonals AC and BD	3 mm	
2. FLATNESS A BOW	25	65	Point of maximum bow on two faces of each member	Glazed member 1.5 mm in 1200 mm Non-glazed member 3.0 mm in 1200 mm	
B TWIST	25	65	Any corner relative to the other three	2 mm	

B16 Requirements of accuracy

To be carried out on receipt of specimen.

1 Dimensional accuracy

Before any tests are carried out the specimens shall be checked for dimensional accuracy as required by the performance specification and to the tolerances indicated by the tenderer.

2 Squareness

All frames to opening lights shall be checked for squareness by measuring the diagonals. Suitably designed corner jigs shall be used to ensure accurate measuring. The difference between the length of the diagonal shall not exceed the limits stated in Table 1.

3 Bow

The window shall be set up in a vertical position.

Each member shall be checked for bow on two faces, the faces being at right angles to each other.

The checking shall be done by straight edge and the deviations shall not exceed those stated in Table 1.

4 Twist

Opening lights other than sliders shall be checked for twist.

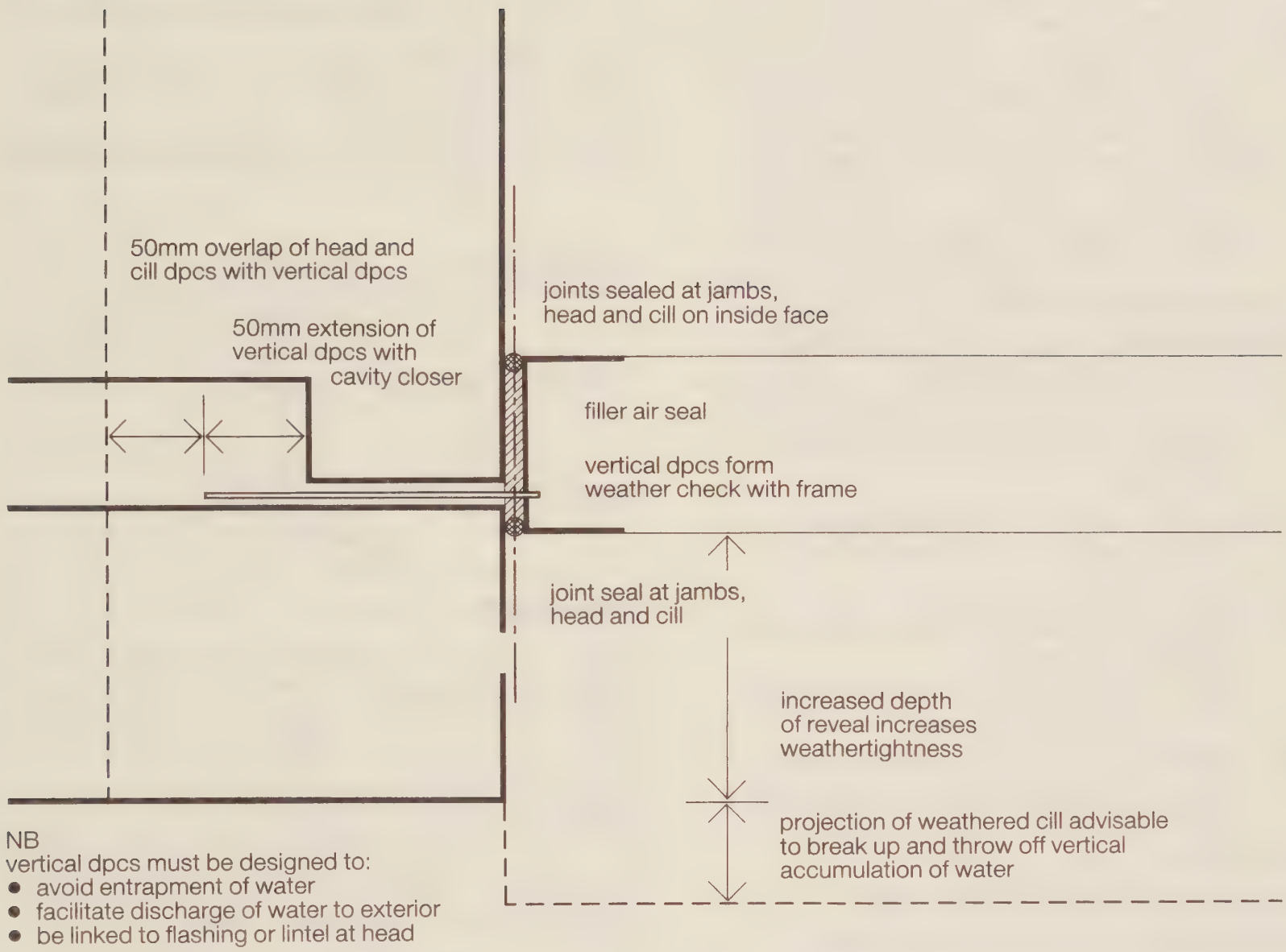
A plumbline or plane of reference is established through one corner point on the hinge side and one corner point on the opposite side.

The deviations of the remaining corner points from the plumblines are measured.

If these deviations are found at diagonally opposite corners they are added. If they are at corners at the same level they are subtracted.

The resulting twist measurement shall not exceed the limits stated in Table. 1.

C Window to wall joint principles



NB
vertical dpcs must be designed to:
- avoid entrapment of water
- facilitate discharge of water to exterior
- be linked to flashing or lintel at head

References

Users are advised to ensure that they refer to current editions.

Other DoH Data

Activity database
Health Building Notes
HBN 40 Common activity spaces
Health Technical memoranda
Nucleus Study No. 18 Daylighting study
Nucleus Hospitals

British Standard Specifications

BS 644 Wood windows
BS 952 Glass for glazing :
Part 1 : Classification
Part 2 : Terminology for work on glass
BS 1186 Quality of timber and workmanship in joinery :
Part 1 : Quality of timber
Part 2 : Quality of workmanship
BS 1204 Synthetic resin adhesives for wood
BS 1285 Specification for wood surrounds for steel windows and doors
BS 2750 Methods of measurement of sound insulation in buildings and of building elements
BS 3987 Anodic oxide coatings on wrought aluminium for external architectural applications
BS 4315 Methods of test for resistance to air and water penetration:
Part 1 : Windows and structural gasket glazing systems
BS 4842 Stoving organic finishes on aluminium extrusions and preformed sections for external architectural application
BS 4873 Aluminium alloy windows
BS 4891 A guide to quality assurance
BS 5358 Specification for low-lead solvent thinned priming paint for woodwork
BS 5368 Methods of testing windows :
Part 1 : Air permeability test
Part 2 : Watertightness test under static pressure
Part 3 : Wind resistance test
Part 4 : Form of test report
BS 5589 Code of practice for preservation of timber
BS 5642 Sills and copings
BS 5707 Solutions of wood preservatives in organic solvents
BS 5713 Specification for hermetically sealed flat double glazing units:
BS 5750 Quality systems
BS 5821 Method of rating sound insulation in buildings and of building elements
BS 6150 Code of practice for painting of buildings
BS 6206 Impact performance requirements for flat safety glass and safety plastics for use in buildings
BS 6262 Code of practice for glazing for buildings
BS 6375 Performance of windows :
Part 1 : Classification for weather-tightness
BS 6510 Steel windows, sills, window boards and doors
DD 67 Basic data for the design of buildings: sunlight
DD 73 Basic data for the design of buildings: daylight
DD 93 Method of assessing exposure to wind driven rain

British Standard Codes of Practice

CP 3 Code of basic data for the design of buildings: Chapter V: Part 2: Wind loads
CP 153 Windows and rooflights:
Part 1 : Cleaning and safety
Part 2 : Durability and maintenance
Part 3 : Sound insulation
Part 4 : Fire hazards associated with glazing in buildings

BRE Digests

No 41 Estimating daylight in buildings - Part 1
No 42 Estimating daylight in buildings - Part 2
No 73 Prevention of decay in external joinery
No 119 The assessment of wind loads
No 127 An index of exposure to driving rain
No 128 Insulation against external noise Part 1
No 129 Insulation against external noise Part 2
No 140 Double glazing and double windows
No 201 Wood preservatives : pretreatment application methods
No 261 Painting woodwork
No 262 Selection of windows by performance
No 286 Natural finishes for exterior timber

BRE Information Papers

IP 16/81 The weatherstripping of windows and doors
IP 2/82 Ergonomic requirements for windows and doors
IP 16/82 The selection of window hardware by performance
IP 20/82 The effect of water repellent preservative treatment on moisture levels in window joinery
IP 9/84 Water borne paints for exterior wood

Other BRE Publications

Building Research Advisory Service – Technical Information TIL 65, – Window Materials and Finishes

Building Research Establishment Note N129/82 – Why do window-to-wall joints leak? a laboratory study.

BRE Report – Timber selection by properties – the species for the job.
Part 1 – windows, doors, cladding and flooring.

Princes Risborough Laboratory:

Technical Note No 24 – "Preservative treatment for external softwood joinery timber"

Technical Note No 28 – "Maintenance and repair of window joinery"

Technical Note No 40 – "The natural durability classification of timbers"

Other Publications

BSI Draft Report –
"Method for assessing exposure to wind-driven rain" (issued early 1984)

Glass and Glazing Federation –
"Timber windows finished in exterior wood stains"

The Building Regulations.

The Building Standards (Scotland) (Consolidation) Regulations.

The Building Regulations (Northern Ireland).

The London Building (Constructional) Byelaws.

Property Services Agency –
Method of Building and Component Data Base – Performance Specification, Windows – Sixth Edition : September 1988

The Paintmakers Association of Great Britain Ltd
"Blight on Britain's Buildings – a survey of paint and maintenance practice" – 1983

Specifying Aluminium Windows – Aluminium Window Association, including other technical documents.

A Trade Standard for uP.V.C. Windows – The British Plastics Federation Glass and Glazing Federation.

The Specifiers Guide to Standard and W2O Steel Windows – Steel Window Association.

Trade Associations

Aluminium Window Association
26 Store Street, London WC1E 7EL

Architectural Aluminium Association
193 Forest Road, Tunbridge Wells, TN2 5JA

British Blind & Shutter Association
251 Brompton Road, London SW3

British Plastics Federation
5 Belgrave Square, London SW1 8PH

British Wood Preserving Association
150 Southampton Row, London WC1B 5AL

British Woodworking Federation
82 New Cavendish Street, London W1M 8AD

Glass and Glazing Federation
6 Mount Row, London W17 6DY

Paintmakers Association of Great Britain Ltd.
93 Albert Embankment, London SE1 7TY

Patent Glazing Conference
13 Upper High Street, Epsom, Surrey KT17 4QY

Steel Window Association
26 Store Street, London WC1E 7JR

Timber Research and Development Association
Stocking Lane, Hughenden Valley, High Wycombe, Bucks HP14 4ND

Index of Guidance Amendment No. IGAN 14
(for internal use)

The following documents are cancelled by the contents of this document:–
CDB2 : MDB2/3

Printed in the United Kingdom for Her Majesty's Stationery Office
Dd290388 8/89 C50 G3390 10170

HMSO publications are available from:

HMSO Publications Centre
(Mail and telephone orders only)
PO Box 276, London, SW8 5DT
Telephone orders 01-873 9090
General enquiries 01-873 0011
(queuing system in operation for both numbers)

HMSO Bookshops
49 High Holborn, London, WC1V 6HB 01-873 0011 (Counter service only)
258 Broad Street, Birmingham, B1 2HE 021-643 3740
Southey House, 33 Wine Street, Bristol, BS1 2BQ (0272) 264306
9-21 Princess Street, Manchester, M60 8AS 061-834 7201
80 Chichester Street, Belfast, BT1 4JY (0232) 238451
71 Lothian Road, Edinburgh, EH3 9AZ 031-228 4181

HMSO's Accredited Agents
(see Yellow Pages)

and through good booksellers

£3.90 net

ISBN 0 11 321238 0